



## SWIMMING AID DEVICE

### Background of the Invention

5 The invention relates to swimming aid devices or swimming aids which can be adapted flexibly to body size by providing a multiplicity of ready-to-wear sizes. The swimming aid device or swimming aid according to the invention may be designed in a lightweight, highly elastic form and may be adjusted to fit the desired body size of the user exactly.

### 10 Description of the Prior Art

For applying to the body swimming aids consisting of foil with air chambers are largely used. Mention should also be made in this connection to the widely used "swimming wings" which are worn on the upper arm. In such a design, lifting capacity in the water is provided but unimpeded  
15 movement is considerably limited. Swimming aid devices of prior art, which are put on with straps, only have buoyancy elements on the back, as disclosed in DE 200 05 183 U1, thereby limiting safety and functionality. A swimming aid with buoyancy elements around the chest region and arms is described in DE 3239929 C2.

20 Furthermore, bathing suits, combined with plug-in styropore or enclosed air chambers, are known – see also US 5413485A, but these only fit according to the size of the bathing suit and are mainly worn by girls only.

For the purpose of acting as a sailing/surfing jacket, with distribution of the loading of forces, US  
25 4545773A describes a device in which a hook provides a releasable connection to a part of the sail/surf board and in which belts or straps which are connected to the hook on the one hand and to hip and shoulder parts of the sailing/surfing jacket on the other allow distribution of the loading of forces.

### 30 Summary of the Invention

The object of the invention is to guarantee the user or wearer of the swimming aid device sufficient buoyancy and safety in the water, with a substantial freedom of movement, comfortable closing characteristics and flexibility. The invention provides a swimming aid  
35 device for wearing on the body and for providing buoyancy, comprising a size-variable element

(1; 100) that can be adjusted to the body size, with a first, releasable closure means (20, 21; 10, 15, 17), whereby the variable body size adjustment can be set, at least one buoyancy element, wherein the device comprises a further second, releasable closure means (4, 19, 22, 23, 24; 14) which can be released without altering the set body size adjustment of the size-variable section (1; 100).

Preferred embodiments include a swimming aid device having one or more of the following features:

- (a) a device designed in the form of a jacket (100), wherein the size-variable section (100) that can be adjusted to the body size is provided for body size adjustment in the hip and/or waist regions, with an adjustable reclosable closure technique as the first, releasable closure means (10, 15, 17), and wherein the second, releasable closure means is a reclosable closure (14) which enables the swimming aid device to be put on and taken off conveniently and quickly without altering the body size adjustment of the swimming aid device;
- (b) a device characterised in that the first, releasable closure means is designed in the form of lateral straps with Velcro tapes (10, 15, 17), and in that the further second, reclosable closure means is designed as a zip (14) or as clicking closures;
- (c) a device characterised in that the lateral straps are closed toward the back of the jacket, and/or in that the further second, reclosable closure means (14) is protected by a cover (25);
- (d) a device according characterised in that the jacket comprises a variably adjustable arm cut out section, wherein an adjustable reclosable closure, preferably in the form of a shoulder strap with Velcro tape (11, 16, 18), is provided for variable adjustment on the back part and front part in the upper region;
- (e) a device characterised in that the size-variable element that is adjustable to the body size is designed as a support strap (1);
- (f) a device characterised in that at least one of the following arrangements of at least one buoyancy element is provided for controlling the buoyancy:
  - at least one buoyancy element is permanently integrated in the size-variable element (1; 100);
  - further buoyancy elements, e.g. cushions filled with buoyant material or panels of closed cell foam, are optionally provided on the front and rear parts of the size-variable element (1; 100), or front and/or rear parts of the size-variable element

(1; 100) can themselves be opened and reclosed so that buoyant material can be removed or added;

- a buoyancy element (2; 6) is attachable on the chest side next to a buoyancy element (3; 7) on the rear side;

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(g) a device characterised in that a buoyancy element (6) is attachable to the closure point (20, 21) of the support strap with Velcro tape (23) or another reclosable closure means so that the support strap (1) is closed once more as an entire system (4, 19, 24) and is protected against accidental opening;

10 (h) a device characterised in that the size-variable element (1; 100) comprises chambers of water- and airtight material, filled with air, and form buoyancy elements and guarantee buoyancy, optionally combined with other buoyant materials;

(i) a device characterised in that the support strap (1) can be releasably closed, with exact fitting, by means of a Velcro closure or by means of another reclosable closure technique, e.g. buttons, tapes and clicking closures, preferably in the chest region;

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(j) a device characterised in that the buoyancy element (2; 6) on the chest side and on the side facing toward the body has a closure means (23) for fastening to the support strap (1) and on the side facing away from the body has a further closure means (24) as additional fastening for an additional closure (4, 19) of the support strap (1), wherein a Velcro closure (23, 24, 4) preferably serves as the closing means in each case;

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(k) a device characterised in that the buoyancy element comprises a closed cell foam material and is arranged in one or more of the following forms:

- inserted as a filling in the support strap (1);
- cut as panels to different shapes, e.g. figures or heads, and designed in different colours and releasably connected to the support strap (1);
- as form-foamed, plastic or semi-plastic shapes or figures;

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(l) a device characterised in that the size-variable element (1; 100), adjustable to the body size, in particular the jacket or the support strap, and/or the buoyancy element(s) (2, 3, 6, 7) are covered with cloth material and are provided with imprints, embroidery, iron-iron transfers and darts; and

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(m) a device characterised in that the buoyancy element comprises filling material with buoyant granulates, flocks, beads or material combinations.

According to the invention the swimming aid device can be adapted exactly to the respective body.

- 5 The invention provides certain uni-sizes, which means that due to the substantial variability of the adjusting possibilities of the swimming aid device sizes 92 to 122 in children, for example, and sizes 48 to 62 in adults, for example (German size standard in each case, sizes according to M to XL in adults) can, according to design, be covered in a single size of the swimming aid device. In children this swimming aid therefore “grows” with them in practice.
- 10 The swimming aid device according to the invention has significant advantages over the state of the art, advantages which are not seen in conventional swimming aid devices. For instance, the swimming aid device according to the invention allows variable adjustability of the size but at the same time guarantees safety for the user during use and improves functionality. The first, releasable closure means is used to preset the variable size. The embodiment according to the
- 15 invention advantageously prevents the loss of buoyancy and/or ability of the swimming aid device to be worn on the body of the user by the opening and releasing of the second closure means. Independently of the first closure means, i.e. without having to release it, the second closure means can be released and separated - if necessary completely - by the user when wearing the aid. For example, the second, releasable closure means can be used, for example, for
- 20 additional opening of the size variable part, which is explained in more detail hereafter in the example of the second preferred embodiment in the form of a jacket, or for fitting the buoyancy element and preferably an additional buoyancy element, which is explained hereafter in the example of the first preferred embodiment in the form of a support strap system, but where, in the embodying cases the full release or separation of the second closure means available to the
- 25 user him/herself may be effected without altering the preset body size adjustment. This increases safety and functionality substantially.

- 30 The features of the preferred embodiments offer further significant advantages: the features (a) and (b) each provide improved designs with simple, reliable, variable presetting of the body size adjustment, whilst at the same time enabling the swimming aid device to be put and taken off conveniently and quickly. Here the swimming aid device can be adapted flexibly, through many ready-to-wear sizes, to the exact body size of the user. The features (c) provide additional safety. The features (d) improve the fitting accuracy of the swimming aid device generally, whilst still allowing the device to be conveniently and quickly put on and taken off. The features (e) relate

to an alternative design which provides a particularly light and highly elastic swimming aid device which can again be adapted exactly and very flexibly to the body size through many ready-to-wear sizes, whilst at the same time further improving safety during wearing. The features (f) further improve functionality, simply and efficiently. Safety, particularly for children and handicapped persons, is additionally improved with the features (g) and (j). Accidental opening of the swimming aid device is prevented by means of a buoyancy element fitted at the point of closure of the support strap. The features (h) provide an ideal swimming aid device with high wearing comfort. With a suitably designed first closure element an extremely advantageous, simultaneous combination of size variability on the one hand and reliable wearing on the other hand is achieved with the features (i). The arrangements described feature (k) improve and extend functionality. The same applies to the features of Claims (l) and (m).

The swimming aid device according to the invention may be used for children and adults alike.

For children this swimming aid is ideal for learning to swim. Design variants, with the possibility of buoyancy adjustment, are also useful. For instance, the total buoyancy setting is used initially for creating a feeling of safety, for acclimatising to the water and for practising swimming movements. As the child progresses in the swimming lessons, the buoyancy can be reduced by reducing the volume and/or the material of the buoyancy element (elements) of the swimming aid device, whereupon the child can progress to free swimming.

This invention can generally be worn for the safety of children during activities on and in the water.

Adults may also wear this swimming aid device for safety in the water and in connection with various sporting and leisure activities. Ideal applications include, for example, swimming courses, aqua jogging and water gymnastics, and also surfing, waterskiing, rafting, paragliding and water excursions by boat or on fun rides, for example.

Moreover, people can be located faster with suitable colouring, and if the swimming aid device is designed in the form of a jacket, the body is better protected from UV radiation, injuries and loss of body heat.



Other important fields of application are rehabilitation and handicapped assistance and support. A very high degree of wearing comfort is guaranteed with this swimming aid device, and natural movements are not impeded, so that suitable therapies are well supported by the device.

5 The invention is described in further detail hereafter by means of exemplary embodiments.

### Brief Description of the Drawings

10 Non-restrictive examples of the use and design of swimming aid devices according to the invention are shown in the drawings, in which

- 15 - Figure 1 and Figure 2 show a swimming aid device with support strap and buoyancy elements according to a first embodiment of the invention for children, Fig. 1 showing the view from the front and Fig. 2 the view from behind. In this representation chest and back cushions of a textile material are sewn and filled with closed cell foam panels;
- 20 - Figure 3 and Figure 4 show a swimming aid device with support strap for children, Fig. 3 showing the front view and Fig. 4 the rear view. In this representation the chest and back sections are cut from a closed cell foam material and are connected directly to the chest strap.
- 25 - Figure 5 shows a particular design of the swimming aid device according to the principle of the first embodiment of the invention in horizontal cross-section, where, in addition to the first closing means for variable body size adjustment, an additional closing means is provided on the first closing means, including a buoyancy element;
- 30 - Figures 6a to 6f show components of the swimming aid device, with support strap, according to the first embodiment of the invention, Figure 6a showing the outside view of the support strap and Figure 6b showing the view of the body side of the support strap. Figures 6c and 6d show the chest cushion, Figure 6c showing the outside view (the side facing away from the body) and Figure 6d showing the inside view (the side facing toward the body). Figures 6e and 6f show the back cushion, Figure 6e showing the outside view and Figure 6f the view of the body side. In this representation all the parts are sewn from textile material and are filled with buoyant material;

- Figures 7a and 7b show a jacket-type swimming aid device according to the invention in a design for children, Figure 7a showing the view from the front and Figure 7b showing the view from the rear. In this representation the swimming aid device is sewn from textile material and is filled with closed cell foam panels. In this embodiment all the straps shall be closed at the rear for safety reasons and the zip handle is protected with a cover;
- Figures 8a and 8b show a jacket-type swimming aid device according to the invention in a design for adults, Figure 8a showing the front view and Figure 8b showing the rear view. In this representation the swimming aid device is sewn from textile material and is filled with closed cell foam panels.
- Figures 9a to 9c show a swimming aid device according to the invention according to the principle of the second embodiment as a jacket-type design in its component parts, Figure 9a showing the view of the back section and Figures 9b and 9c the view of second front sections. All the parts are sewn from a textile material and are filled with buoyant material.

## 20 DESCRIPTION OF PREFERRED EMBODIMENTS:

### First preferred embodiment

- Panels of closed cell foam material of varying thickness, elasticity and weight may be used to manufacture the swimming aid device according to the invention. All suitable buoyant materials may be used, including buoyant granulates, flocks and beads, e.g. of polystyrene and cork. Furthermore, chambers of water- and airtight material can guarantee buoyancy when filled with air. Shapes, e.g. animals, heads and figures can also be cut from panel material 6 and 7 (Figs. 3 to 5), which may be designed in different colours, e.g. dyed, printed, coated and glued. Buoyant materials which are surrounded by textile material may be provided with motifs and advertising by printing, sewing, embroidery, stickers and iron-on transfers.

Figurative and semi-plastic objects, which may also be designed in different colours, may be used as buoyant elements by mould foaming.

In a preferred embodiment of the invention a closed cell polyethylene foam (e.g. 10 mm thick), sewn in textile material, may be used as support strap 1 (Figs. 1-5, 6a and 6b). Infinitely variable adjustment on the body is possible by means of Velcro tape 20 and 21 (Figs. 6a and 6b). The attachments are sewn from textile material and filled with closed cell foam material, e.g. polyethylene or polyurethane foam. The filling may consist of a plurality of panels until the desired buoyancy is obtained. The panels are loosely inserted, which provides greater elasticity. Back cushions 3 (Figs. 2, 6e and 6f) are pulled up to support strap 1 with tape loops 5, and front cushions 2 (Figs. 1, 6c and 6d) are secured by means of Velcro tape 23, 24, (Figs. 6c and 6d). The size of the cushions is dimensioned so that they provide sufficient buoyancy.

In the swimming aid device with support strap and buoyant elements for children, shown in Figs. 1 and 2 generally and in Figs. 6a-6f in its component parts, chest and back cushions are sewn from textile material and are filled with closed cell foam panels. Velcro tapes, as the first closing means, are fitted at different points on the support strap ends for closing the support strap. Thus a Velcro tape 20 is only fitted on the outside of the first end of the support strap, which tape, when closed, hooks into Velcro tape 21 of the second end of the support strap fitted on the inside. A Velcro tape is additionally fitted on the second end on the outside 22, and on the chest cushion on the inside 23, as the second closure means for fastening chest cushion 2 to the closing point on the support strap. Chest cushion 2 is fixed once more (23 and 24 in Figs. 6c and 6d) by means of 2 Velcro tapes (4 in Fig. 1, 19 in Fig. 6a), each of which is fitted in a region in front of the support strap ends.

In the embodiment shown in Figs. 3 and 4 the connection is made, in addition to the size variable presetting of support strap 1 with the first closure means, by means of the second closure means, which is designed in the form of recesses in buoyancy element 6, 7 and Velcro tape 8 pulled through on front buoyancy element 6 and loops 9 on rear buoyancy element 7. Fig. 5 shows a further embodiment in horizontal cross-section, wherein a Velcro tape 4 is provided as a second closure means, not as in Fig. 3 in the form of a recess in the front buoyancy element, but in the forward direction along the lateral face of front buoyancy element 6. With the designs in Fig. 3 and Fig. 5 examples are shown in which the first closure on support strap 1 is closed once again by the second closure and is therefore further secured. Body 6 serving as the buoyancy element therefore sits securely on the variable closure.



The material for the support strap is widely variable. The strap may, for example, may be formed, as described, from foam material sewn into textile material, but may also be formed from fabric materials, elastic tape or commercially available straps. The width and thickness may also be selected according to requirements. A suitable width is 1 to 15 cm, for example, preferably 2 to 7.5 cm and in particular 3 to 5 cm. A suitable thickness is for example 0.5 mm to 2 cm, preferably 2 mm to 1 cm.

Second preferred embodiment:

- 10 In a further particularly preferred embodiment of the invention the swimming aid device is made in the form of a jacket from textile material. The textile material is connected to a thin buoyant material (e.g. approx. 3 – 5 mm), e.g. by sewing or gluing, which positively influences the optics in particular. The component parts are then sewn together, filled with buoyant material (e.g. closed cell polyethylene or polyurethane foam panels, e.g. approx. 10 mm thick), and closed. The
- 15 buoyant material filling may consist of a plurality of panels until the desired buoyancy is obtained. The panels are loosely inserted, which increases elasticity. Material properties of the panels, such as volume, type of material and porosity, are dimensioned so that sufficient buoyancy is provided. In the chest region and in the upper back region the filling is designed to be thicker, which corresponds more closely to the body weight proportions and the desired
- 20 behaviour in water. Infinitely variable adjustment on the body is made possible by means of Velcro tape on the sides and in the shoulder region. The lateral adjustments are made by means of widely overlapping straps 10 (Figs. 7b and 8a), onto which Velcro tape or Velcro surfaces 15, 17 (Fig. 9a-9c) are sewn. The adjustment facility in the shoulder region, by means of additional strap 11 and Velcro closures 16, 18 (Figs. 7b, 9a-9c) is used to adapt to the upper arm and
- 25 shoulder in question, so that the arm section always fits exactly. This adjustment facility also serves to prevent the effect of the swimming aid device sliding up on the body due to buoyancy in the water. Because of the precisely fitting closure of the shoulder straps, the lateral straps always lie immediately underneath the shoulders, thereby preventing the device from sliding up in the water. An additional closure, e.g. a zip or another reclosable closing means, such as a
- 30 clicking closure, enables the device to be put on and taken off conveniently and quickly. Thus a user of the device is able to omit adjusting the Velcro closures and wear the swimming aid device as a jacket; in that case he/she need only open and close the closure means (the second one in this embodiment), e.g. the actuate zip 14 (Figs. 7a, 9b).

Once the jacket-type embodiment of the swimming aid device according to the invention has been adjusted for a particular person, it will in future require no further adjustments. The swimming aid is then put on and taken off simply as a jacket. Putting on and taking off the swimming aid, and adjusting it to the particular body size, are operations that can be carried out quickly and safely.

The end product should be tolerable to the skin and harmless to health.

#### EXAMPLES:

##### Example 1:

Construction of a swimming aid device with support strap for children, according to the invention, with a buoyancy volume of approx. 4 litres, e.g.:

- Support strap 1 (Figs. 1-4; 6a and 6b): 110 mm wide, 10 mm thick closed-cell polyethylene foam ( $30 \text{ kg/m}^3$ , e.g. Cellu-Cushion from the company SEALED AIR) sewn into material (e.g. polyester material 5407-7200 from UCO), with Velcro tape (50 mm wide, e.g. polyester Velcro tape from APLIX) provided for the connection.
- Chest cushion 2 (Figs. 1; 6c and 6d): 4 x 10 mm thick PE foam in reclosable material sleeve with sewn on Velcro tape for fastening to the support strap (materials as support strap), the chest cushion can be secured on the side with Velcro tape 4 (Fig. 1) or 19 (Fig. 6a). The closure of the support strap, which is used for size variable adjustment, is then additionally protected against accidental opening.
- Back cushion 3 (Figs. 2; 6e and 6f): 4 x 10 mm thick PE foam, materials as chest cushion, but instead of a Velcro tape connection provided with sewn on tape loops 5 (Figs. 2; 6f) for pulling up onto the support strap.

##### Example 2:

Construction of a jacket-type swimming aid device for children, according to the invention, with a buoyancy volume of approx. 4 litres and a total weight of approx. 230 g, e.g.:

- The swimming aid device is sewn from textile material (e.g. polyester material 5407-7200 from UCO). The textile material is sewn on complete with a thin closed cell foam (e.g. 3 mm thick, e.g. TEE 3003-00 from ALVEO). A closed cell polyethylene foam (e.g. 30 kg/m<sup>3</sup>, 10 mm thick, e.g. Cellu-Cushion from the company SEALED AIR) is used as the buoyant material. A little more polyethylene foam is inserted in the chest and upper back regions and is fixed with darts 12 to protect against sliding (see Figs. 7-9). Straps 10, with sewn on Velcro tape 17 (e.g. 50 mm wide, e.g. polyester Velcro tape from APLIX)), which rests against Velcro tape 15 for releasable closure, is provided as a first closure means for size variable adjustment, and a zip 14 (e.g. 270 mm, e.g. P60 from Coast) is used for putting on the jacket (e.g. putting on and taking off the jacket quickly (Figs. 7-9). In the case of young children, the closure straps can be closed towards the back, for safety reasons (see Fig. 7b) and the zip handle protected with a cover 25 (Fig. 7a).
- 15 To achieve variability of the buoyancy volume, cushions with buoyant material or foam panels, for example, are fastened to the front and/or back sections of the swimming aid device, and the swimming aid device is manufactured with reclosable pockets (e.g. with Velcro tape, zip or other reclosable closure techniques), so that buoyancy material can easily be removed and refilled if necessary. The additional buoyancy elements may, if necessary, be fitted or removed again.
- 20 Further features of the swimming aid device according to the invention are that an extremely high degree of wearing comfort is guaranteed by the exact fitting adjustment facilities and the use of extremely light, elastic materials. The swimming aid device is put on and taken off, and adjusted to the body size in question, quickly and safely.
- 25 An advantage of the swimming aid device of variable size according to the invention also lies in the fact that all ready-to-wear sizes can be covered with only a small number of models. Because of the small number of parts and materials required the production costs are minimised and customers, dealers, hirers, trainers and therapists incur lower acquisition and stocking costs
- 30 because of the smaller number of different sizes required.

## List of reference numbers

	1	Support strap
	2	Chest cushion
<b>5</b>	3	Back cushion
	4	Additional protection for the buoyancy element on the support strap
	5	Tape loops for pulling onto the support strap
	6	Buoyancy element front
	7	Buoyancy element back
<b>10</b>	8	Fastening for buoyancy element, with support strap, front side
	9	Fastening for buoyancy element, back
	10	Lateral strap for adapting to body size
	11	Shoulder strap for adapting the arm section
	12	Stitching
<b>15</b>	13	Hanger
	14	Zip
	15	Lateral strap with hooked Velcro tape
	16	Shoulder strap with hooked Velcro tape
	17	Lateral strap with flanged Velcro tape
<b>20</b>	18	Shoulder strap with flanged Velcro tape
	19	Velcro tape for securing buoyancy element
	20	Support strap closure with hooked Velcro tape
	21	Support strap closure with flanged Velcro tape
	22	Velcro tape for fastening the buoyancy element
<b>25</b>	23	Velcro tape for fastening with the support strap
	24	Velcro tape for additional securing of the buoyancy element
	25	Zip fastening